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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,681	12/19/2006	Masaaki Yamakata	062408	4625

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EXAMINER	
GONZALEZ QUINONES, JOSE A	

ART UNIT	PAPER NUMBER
2834	

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05/29/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,681	YAMAKATA ET AL.	
	Examiner	Art Unit	
	JOSE A. GONZALEZ QUINONES	4113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20060706,20060413*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on April 13, 2006, and July 06, 2006 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

Claim Rejections - 35 USC § 103

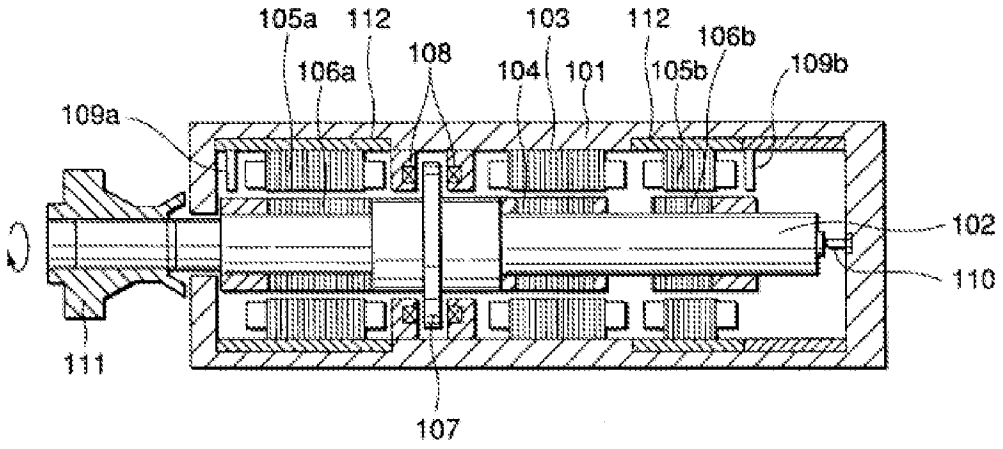
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fakuyama et al. (6,121,704) in view of Boyd Jr. et al. (6,223,416) and Watanabe et al. (5,914,548).

As to claim 1, Fakuyama et al. teach magnetic bearing comprising a shell 101 like a case, a rotor 104 and 106 like a mover freely movable in the shell 101 like a case and stators 103 and 105 for driving the rotor 104 and 106 like a mover by magnetic force as shown in figure 1 (reproduced below).

FIG.1 PRIOR ART



However Fakuyama et al. fails to disclose in that each of the stators contains a core mounted at the outside of the case and a magnetic coil wound around the core, and at least an end face of the core constituting a magnetic pole is formed of non-laminated ferromagnetic substance and exposed to the inner surface of the case so as to form a part of the inner wall of the case.

Boyd, Jr et al. teaches a stator 22 contains a core 24 mounted outside of the case and a magnetic coil 27 wound around the core 24 as shown in figure 1 and figure 2.

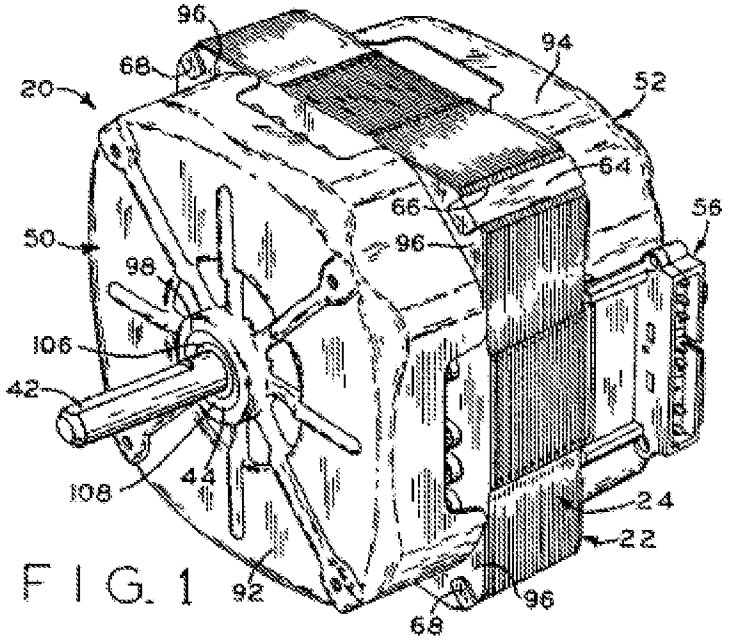

96
68
20
94
52
64
66
56
50
98
96
106
42
44
108
24
22
92
96
68

FIG. 1

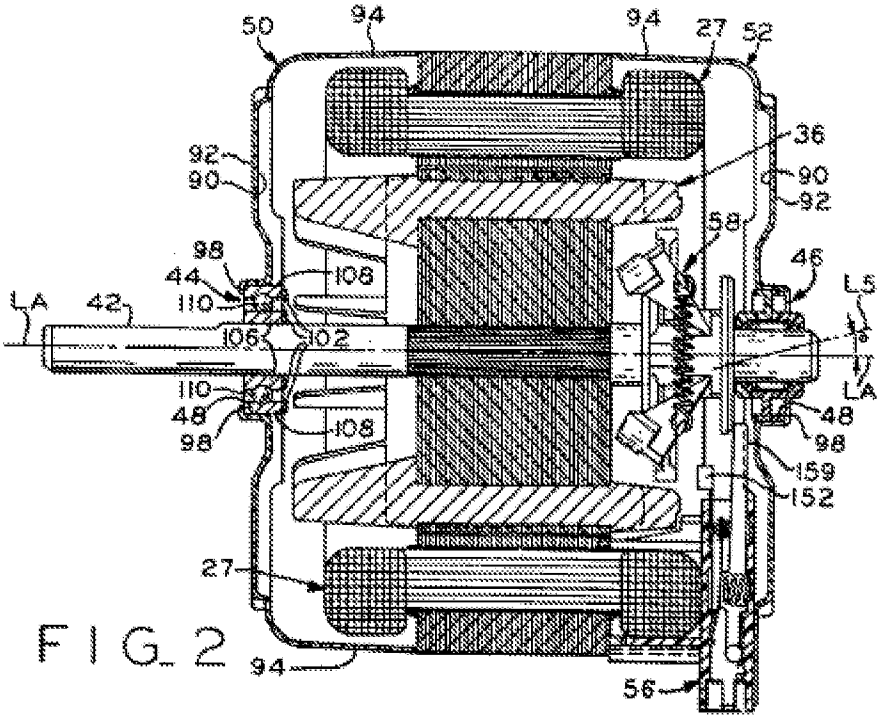

50
94
94
27
52
36
92
90
90
92
58
98
46
44
108
LA
42
110
LS
106
102
LA
110
48
48
98
108
98
159
152
27
94
56

FIG. 2

Watanabe et al. teaches a stator 11 has a magnetic pole 15 and at least an end face of the magnetic pole 15 is formed with a partition wall 33 of nonmagnetic metal (Column 7, Line 44) and as shown in figure 1 and exposed to the surface of the housing member 23 like a case to form a part of the inner wall of the housing member 23.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fakuyama et al. by using stators contains a core mounted at the outside of the housing and a magnetic coil wound around the core and a nonmagnetic substance is exposed to the inner surface of the housing so as to form a part of the inner wall of the housing as taught by Boyd Jr et al. and Watanabe et al. to provide the capability of being form vacuum condition.

As to claim 2, Fakuyama et al. teaches a rotor 104 and 106 like a mover are freely rotatably supported in the case, and the stators 103 and 105 are disposed at a fixed interval in the peripheral direction so as to rotationally drive the rotor as shown in figure 1.

As to claim 3, Fakuyama et al. teaches a rotor 104 and 106 like a mover is a linearly freely movable in the case, and the stators 103 and 105 are arranged at a fixed interval in the moving direction on the shell 101 like a case so as to linearly drive the mover as shown in figure 1.

Claims 4-5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fakuyama et al. (6,121,704) in view of Wehde et al. (4,082,376), Boyd Jr. et al. (6,223,416) and Watanabe et al. (5,914,548).

As to claim 4, Fakuyama et al. teaches having shell 101 like a case, a rotor 104 and 105 like a mover freely movable in the shell 101 like a case, stators 103 and 105 for driving the rotor 104 and 106 like a mover by electromagnetic force and a magnetic bearing for supporting the rotor 106 like a mover in a non-contact style so that the rotor 106 like mover is freely movable as shown in figure 1.

However Fakuyama et al. fails to disclose in that the magnetic bearing is equipped with a bearing electromagnet and a bearing ferromagnetic portion provided to a site facing a magnetic pole of the bearing electromagnet in the mover, the bearing electromagnet contains a core mounted at the outside of the case and a magnetic coil wound around the core, at least an end face constituting the magnetic pole is formed of non-laminate ferromagnetic substance, and exposed to the inner surface of the case so as to form a part of the inner wall of the case.

Wehde et al. disclose magnetic bearing is equipped with a bearing electromagnet and a bearing ferromagnetic portion provided to a site facing a magnetic pole of the bearing electromagnet in the mover (Column 1, Line 16).

Boyd, Jr. et al. teaches a stator 22 like a electromagnet contains a core 24 mounted outside of the case and a magnetic coil 27 wound around the core 24 as shown in figure 1 and figure 2.

Watanabe et al. teaches a stator 11 has a magnetic pole 15 and at least an end face of the magnetic pole 15 is formed with a partition wall 33 of nonmagnetic metal (Column 7, Line 44) and as shown in figure 1 and exposed to the surface of the housing member 23 like a case to form a part of the inner wall of the housing member 23.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fakuyama et al. by using in that the magnetic bearing is equipped with a bearing electromagnet and a bearing ferromagnetic portion provided to a site facing a magnetic pole of the bearing electromagnet in the mover, the bearing electromagnet contains a core mounted at the outside of the case and a magnetic coil wound around the core, at least an end face constituting the magnetic pole is formed of non-laminate ferromagnetic substance, and exposed to the inner surface of the case so as to form a part of the inner wall of the case as taught by Wehde et al., Boyd Jr. et al. and Watanabe et al. to provide passive stabilization in a radial direction.

As to claim 5, Fakuyama et al. wherein the rotor 104 and 106 like a mover that is supported freely rotatable in the shell 101 like a case, and the stators 103 and 105 are arranged at a fixed interval in the peripheral direction on the shell 101 like a case so as to rotate the rotor.

As to claim 11, Fakuyama et al. teaches a rotor 104 and 106 like a mover is freely linearly movable in the shell 101 like a case, and the stators 103 and 105 are arranged at a fixed interval in the moving direction on the case so as to drive the rotor 104 and 106 like a mover linearly.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fakuyama et al. (6,121,704) , Wehde et al. (4,082,376), Boyd Jr. et al. (6,223,416) and Watanabe et al. (5,914,548) as applied in claim 5 above, and further in view of Amemiya et al. (4,697,114)..

As to claim 6, Fakuyama et al., Wehde et al., Boyd Jr. et al and Watanabe et al. fail to disclose a non-magnetic substance is interposed between the rotor and the bearing ferromagnetic portion.

However Amemiya et al disclose end plate 14 and 15 formed of a nonmagnetic material like a non-magnetic substance (Column 2, Line 61) is interposed between the rotor and the fastening ring 18 and 19 formed of a magnetic iron bearing metal like a bearing ferromagnetic portion (Claim 3) and as shown in figure 1.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify , Fakuyama et al., Wehde et al., Boyd Jr. et al and Watanabe et al. by using a non-magnetic substance is interposed between the rotor and the bearing ferromagnetic portion as taught by Amemiya et al. to prevent a short-circuiting of the magnetic paths.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fakuyama et al. (6,121,704) , Wehde et al. (4,082,376), Boyd Jr. et al. (6,223,416) and Watanabe et al. (5,914,548) as applied in claim 5 above, and further in view of Habermann (4,353,602) and Ogino et al. (Us PG Pub 2004/0112800 A1).

As to claim 7, Fakuyama et al., Wehde et al., Boyd Jr. et al. and Watanabe et al fails to disclose bearing electromagnet contains a thrust electromagnet for supporting the rotor in the axial direction and a radial electromagnet for supporting the rotor in the radial direction, and the bearing ferromagnetic portion contains a thrust ferromagnetic portion provided to a site facing a magnetic pole of the thrust electromagnet, and a

radial ferromagnetic portion provided to a site facing a magnetic pole of the radial electromagnet.

However Habermann teaches a bearing electromagnet 130 like a thrust for supporting the rotor 121 in the axial direction as shown in figure 5.

Ogino et al. teaches radial electromagnet 51 and 52 for supporting the rotor 54 in the radial direction and a radial magnet cylinder 46 like a radial ferromagnetic portion provided to a site facing a magnetic pole of the radial electromagnet 50.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify , Fakuyama et al., Wehde et al., Boyd Jr. et al and Watanabe et al. by using bearing electromagnet contains a thrust electromagnet for supporting the rotor in the axial direction and a radial electromagnet for supporting the rotor in the radial direction, and the bearing ferromagnetic portion contains a thrust ferromagnetic portion provided to a site facing a magnetic pole of the thrust electromagnet, and a radial ferromagnetic portion provided to a site facing a magnetic pole of the radial electromagnet as taught by Habermann and Ogino et al. to provide high operation is enabled for a long period of time free from maintenance.

As to claim 8, Fakuyama et al., Wehde et al., Boyd Jr. et al., Watanabe et al. and Habermann fail to disclose the radial electromagnet contains first and second radial electromagnets for supporting the rotor in radial direction at different two positions thereof, and the radial ferromagnetic portion contains a first radial ferromagnetic portion provided to a site facing a magnetic pole of the first radial electromagnet, and a second

radial ferromagnetic portion provided to a site facing a magnetic pole of the second radial electromagnet.

However Ogino et al. teaches the radial electromagnet (50, 52) contains first and second radial electromagnets for supporting the rotor 54 in radial direction at different two positions thereof, and the radial magnetic cylinders 46 and 48 like a radial ferromagnetic portion contains a first radial ferromagnetic portion 46 provided to a site facing a magnetic pole of the first radial electromagnet 50, and a second radial ferromagnetic portion 48 provided to a site facing a magnetic pole of the second radial electromagnet 52 as shown in figure 1.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify , Fakuyama et al., Wehde et al., Boyd Jr. et al., Watanabe et al. and Habermann by using the radial electromagnet contains first and second radial electromagnets for supporting the rotor in radial direction at different two positions thereof, and the radial ferromagnetic portion contains a first radial ferromagnetic portion provided to a site facing a magnetic pole of the first radial electromagnet , and a second radial ferromagnetic portion provided to a site facing a magnetic pole of the second radial electromagnet as taught by Ogino et al. to provide high reliability, and operation is enabled for a long period of time free from maintenance.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fakuyama et al. (6,121,704) , Wehde et al. (4,082,376), Boyd Jr. et al. (6,223,416), Watanabe et al. (5,914,548) Habermann (4,353,602), Ogino et al. (Us PG Pub

2004/0112800 A1) as applied in claim 8 above, and further in view of Kuwabara (JP2002218684 A)

As to claim 9, Ogino et al. teaches radial magnetic cylinders 46 like a first radial ferromagnetic portion is provided to one end portion in the axial direction of the rotational shaft portion 14 and the radial magnetic cylinder 48 like a second radial ferromagnetic portion is provided to the other end portion in the axial direction of the rotational shaft portion 14.

However Fakuyama et al., Wehde et al., Boyd Jr. et al., Watanabe et al., Habermann and Ogino et al. fail to disclose a rotor contains a rotor portion having plural magnetic poles projecting in the radial direction and a rotational shaft portion that is coaxial with the rotor portion and extends in the axial direction, the rotational shaft portion is formed of non-magnetic substance.

Kuwabara discloses a rotor 1 contains a rotor portion having plural magnetic poles 2 projecting in the radial direction and a rotational shaft portion 4 that is coaxial with the rotor portion and extends in the axial direction, the rotational shaft portion 4 is formed of non-magnetic substance (Abstract) and shown in figure 5 and figure 6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fakuyama et al., Wehde et al., Boyd Jr. et al., Watanabe et al. and Habermann and Ogino et al. by using a rotor contains a rotor portion having plural magnetic poles projecting in the radial direction and a rotational shaft portion that is coaxial with the rotor portion and extends in the axial direction, the rotational shaft

portion is formed of non-magnetic substance, as taught by Kuwabara to suppressed the cogging phenomenon and provide high reliability.

As to claim 10, Fukuyama et al., Wehde et al., Boyd Jr. et al., Watanabe et al. and Ogino et al. fail to disclose a rotor portion of the rotor is formed of aggregated non-laminate ferromagnetic substance, and the thrust ferromagnetic portion is formed integrally with the rotor portion.

However Kuwabara discloses a rotor portion of the rotor 1 is formed of aggregated non-laminate ferromagnetic substance (Abstract).

Habermann teach a thrust portion bearing 130 and 110 is formed with the rotor portion 121 as shown in figure 5.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fakuyama et al., Wehde et al., Boyd Jr. et al., Watanabe et al. and Ogino et al. by using a rotor portion of the rotor is formed of aggregated non-laminate ferromagnetic substance and the thrust portion is formed integrally with the rotor portion as taught by Kuwabara and Habermann to suppressed the cogging phenomenon and provide high reliability.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fakuyama et al. (6,121,704) in view of Wehde et al. (4,082,376), Boyd Jr. et al. (6,223,416) and Watanabe et al. (5,914,548) as applied in claim 4 above, and further in view of Steinmeyer (US PG Pub 2004/0021382 A1).

As to claim 12, Fakuyama et al., Wehde et al., Boyd Jr. et al., and Watanabe et al. fail to disclose a bearing ferromagnetic portion is formed of aggregated non-laminate ferromagnetic substance.

However Steinmeyer discloses a magnetic bearing for a rotor shaft 3 (which can rotate), which may be composed of a nonmagnetic material such as an appropriate steel (Paragraph [0031].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fakuyama et al., Wehde et al., Boyd Jr. et al., Watanabe et al. and Ogino et al. by using a bearing is formed of aggregated nonmagnetic material substance as taught by Steinmeyer to provide high reliability.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSE A. GONZALEZ QUINONES whose telephone number is (571)270-7850. The examiner can normally be reached on 1 st week Monday to Friday 7:30 AM to 5:00 PM and 2nd week Monday to Thursday 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott B. Geyer can be reached on 571-272-1958. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quyen Leung/
Supervisory Patent Examiner, Art Unit 2834

/JOSE A GONZALEZ QUINONES/
Examiner, Art Unit 2834
May 22, 2009